

Application No. 09/977,462
Response and Amendment dated August 4, 2003
Reply to Office Action mailed February 3, 2003

REMARKS

Claims 1-18 were pending in the present application. Claims 1 and 10 were in independent format with the remaining claims being dependent therefrom. By the present Response and Amendment, claims 1-18 have been cancelled, and new claims 19-38 have been introduced for examination. New claims 19 and 29 are in independent format, with the balance of the new claims being in dependent format. No new matter has been added by these new claims.

Applicant submits that these new claims do not exceed twenty (20) total pending claims or three (3) independent pending claims. Thus, no fee for additional claims has been concurrently submitted.

Applicant has requested amendment to the specification to correct a typographical error. No new matter has been introduced by this amendment.

It is respectfully submitted that claims 19-38 are in condition for allowance in view of the remarks presented herein. Favorable consideration of these claims and a Notice of Allowance is respectfully requested.

Claim Objections in the Office Action

Claims 1-18 were objected to by the Office Action for informalities, including for numbering of the claims with non-Arabic numerals and for making reference to other claims within a dependent claim by using non-standard language under US practice. Applicant's newly introduced claims 19-38 obviate the claim objections of the Office Action.

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Prior Art Rejections in the Office Action

Claims 1-2, 4-6, 9-11, 13-15 and 18 were rejected by the Office Action under 35 U.S.C. § 102(b) as being anticipated by Inoguchi et al., U.S. Patent No. 5,945,965 ("Inoguchi"). Additionally, claims 3, 7-8 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Inoguchi in view of Breed et al., U.S. Patent No. 6,442,465 B1 ("Breed"). Insofar as these grounds for rejection apply to the claims presently pending, Applicant respectfully traverses.

In accessing the prior art of record, the Office Action incorrectly asserted that Inoguchi discloses the step of "processing a stereopair image to determine a calculated image (column 7, lines 57-65) containing at least some right-eye image information (R_s) and at least some left-eye image information (L_s) for each of said at least two transmissive electronic displays," and then displaying each calculated image on the transmissive electronic displays to produce an autostereographic image. Given this inaccurate understanding regarding what Inoguchi discloses and teaches to one of ordinary skill in the art, the Office Action thus asserted that Applicant's invention as was recited by now-cancelled independent claims 1 and 10 was anticipated by Inoguchi. Applicant respectfully traverses this rejection of the originally filed independent claims as being based upon an inaccurate interpretation of Inoguchi. Namely, contrary to the assertions of the Office Action, Inoguchi does not disclose, teach or suggest the processing of stereopair images to determine calculated images containing some or both left eye and right eye image information, and then displaying each of those calculated images on a pair of electronic displays spaced on in front of the other as was originally and continues to currently be claimed, as described below. Further, as discussed below, Inoguchi does not disclose, teach or suggest utilizing two images having right eye and left eye information as a mask for one another, also as was originally and continues to currently be claimed.

However, while the originally filed claims are allowable over the art cited in the Office Action, Applicant has elected herein to cancel all previously pending claims and has submitted new claims 19-38 for examination upon the merits. Of these new claims, claims 19 and 29 are in independent format. The Examiner will note that these new claims retain substantial language and form of the original claim set, having only changes that reflect clarifications of the original claim language. The language clarifications reflected in the new claim set do alter the scope of the claimed embodiments of invention. The disclosure and teachings of the asserted prior art will be discussed hereafter with respect to new claims 19-38, however, it should be understood that these remarks apply equally to the original and now cancelled claims.

As submitted herein, claim 19 closely resembles and has commensurate scope with claim 1 (now cancelled), with both claims pertaining to a method for displaying autostereographic images. Similarly, claim 29 closely resembles and has commensurate scope with claim 10 (now cancelled), claiming an autostereographic display system. Claim recites methods for displaying autostereographic images where the method utilizes stored stereopair images and at least two transmissive electronic displays. These displays are spaced one in front of another relative to the viewing area. According to the method of the present invention as recited in claim 19, there is selected one of the stored stereopair images that is then used to process two calculated images. Each of the calculated images contain at least some right-eye image information and at least some left-eye image information, with the first one of the calculated images being adapted for the front display and the second calculated image being adapted for the rear display. The calculated images are then displayed on the appropriate display, with each displayed calculated image acting as a mask for the other displayed calculated image. Backlighting of the transmissive electronic displays causes the display of a stereographic image to be visible in the viewing zone.

Similarly, new claim 29 pertains to a system for displaying autostereographic images that comprises at least two transmissive electronic displays, storage means holding a plurality of stereopair images, means for selecting one of said stored stereopair images, and means for processing the selected stereopair image to produce two calculated images. The calculated images each contain at least some right-eye image information and at least some left-eye image information, with the first one of the calculated images being adapted for the front display and the second calculated image being adapted for the rear display. These calculated images are displayed by display means on an appropriate transmissive electronic display where they are illuminated by backlighting means such that each displayed calculated image acts as a mask for the other displayed calculated image. In this manner, an autostereographic image is produced by the combination of the two calculated images that is visible in a viewing area.

One of ordinary skill in the art will recognize that this is not the type display method and apparatus disclosed by Inoguchi. While Inoguchi may disclose producing a stereographic display using two transmissive electronic displays, a backlight and stereopair images, it does not apply those elements in the manner currently claimed by the Applicant. As described beginning at column 7, line 57, Inoguchi takes stereoscopic (“parallax”) images, i.e., one image for the left eye perspective and one for the right eye perspective, and slices those images into a “vertically elongated stripe pixels,” each pixel having the same width. These stripe pixels are ordered into one “stripe image” by compiling in alternating fashion stripe pixels from each eye image. The stripe image is then viewable as a stereographic image by displaying this stripe image on a first display screen and then overlaying that stripe image with a coordinated parallax barrier (a regular pattern of vertical stripes that are alternate between being either transparent or opaque) image created on second display and overlayed on top of the first image. This technique of using a stripe image combined with a

corresponding parallax barrier is the well-known parallax barrier (or “lenticular screen”) method described in the background section of Applicant’s disclosure at pages 2-3. In fact, Inoguchi recognizes the conventional nature of the stripe image approach by stating at column 1, lines 16-19 that “a stereoscopic image display method using a parallax barrier system … or the like is widely known.”

Inoguchi’s disclosure purports to describe an improvement upon the traditional parallax barrier scheme by providing a mechanism to simultaneously display stripe images with standard, two-dimensional images (the two dimensional images, for example, being used to create backgrounds) and then only subjecting the area of the stripe image on the lower display to a parallax barrier overlay (See, for example, Figs. 11A and 11B of Inoguchi) on the top display. Inoguchi’s disclosure also purports to provide correct for light loss by the parallax images by using a light amount adjusting invention that provides increased illuminating light to stripe images in proportion to the number of image views (See column 12, lines 16-35). As will be readily appreciated by one of ordinary skill in the art, this is not the same as, nor does this teach or suggest, Applicant’s invention as is claimed.

Specifically, as recited by all independent claims, Inoguchi does not disclose, teach or suggest producing two calculated images where “each of said two calculated images [contain] at least some right-eye image information and at least some left-eye image information, a first one of said calculated images being adapted for a front one of said two transmissive electronic displays and a second one of said two calculated images being adapted for a rear one of said transmissive electronic displays.” Further, Inoguchi does not disclose, teach or suggest displaying each said calculated image on an appropriate transmissive electronic display such that each displayed calculated image acts as a mask for the other displayed calculated image.

First, Inoguchi can only be characterized as producing one image, a stripe image, that contains both left and right eye data from the original stereopair. As will be readily appreciated by one of ordinary skill in the art, merely slicing up two stereopair images into even vertical slices and then combining those slices in alternating fashion to create a single, composite stripe image be considered processing the stereopair to create two calculated images as is claimed.

Second, even though Inoguchi's stripe image is then displayed through a parallax barrier bar pattern produced on a second LCD screen to produce a three-dimensional viewing effect for that stripe image, this parallax barrier can in no way be understood by one of ordinary skill in the art to comprise a calculated image according to Applicant's claims. The disclosure of Inoguchi makes it clear and it is readily understood by one of ordinary skill in the art that the parallax barrier is not processed from the original stereopair images. Thus, the parallax barrier does not contain any left eye or right eye information. The parallax barrier merely comprises a series of vertical bars, the spacing and width of the bars being determined solely by the geometry of the system and number of image views being produced simultaneously (See Inoguchi Figs. 16A-16C and accompanying description). The parallax barrier in no way contains image information for the left and right eyes, and therefore cannot comprise a calculated image as is claimed.

Third, even if, *arguendo*, the parallax barrier and stripe image were considered to be calculated images according to Applicant's claims, the stripe image cannot be considered to act "as a mask" for the parallax barrier, as is claimed.

As described in Applicant's specification, Applicant's invention, by creating two calculated images, addresses one problem associated with parallax barrier-created stereoscopic displays: "Since the 3-D image information is distributed between the LCD panels, there is no loss of resolution as found in prior art systems wherein both aspects must be displayed on a single screen or plane, such

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as with lenticular viewing systems” (emphasis added). This is in contrast to the system of Inoguchi where the parallax barrier mask can clearly be seen, leading to reduced area for image information and thus reduced contrast of the three dimensional image. The present invention thereby is capable of creating a continuous 3D image field in a large viewing are with improved image quality, as opposed to a discrete set of stereo viewing zones where the image quality greatly deteriorates as the number of viewing zones increases (See Fig. 18 of Inoguchi).

In light of the above remarks, Applicant submits that claims 19-38 are not anticipated by Inoguchi, and that Inoguchi does not teach or suggest the claimed invention. Thus, all claims of the present invention are allowable over Inoguchi.

The Office Action also rejected original claims 3, 7-8, 12 and 16-17 (now cancelled) for being unpatentable over the combination of Inoguchi and Breed. Insofar as this ground for rejection applies to any of the present claims, Applicant respectfully traverses.

Applicant respectfully submits that Breed is not properly combinable with Inoguchi and that, even if Breed were combinable with Inoguchi, the resulting teaching would not lead one of ordinary skill in the relevant art to produce Applicant’s claimed invention. Applicant’s invention, as well as Inoguchi, relate to displays for producing stereographic images. Breed, however, relates to a passenger recognition technology for automobiles. Nowhere does Breed discuss three-dimensional displays. Being that the fields and technology are not related, one of ordinary skill in the art would not find Breed applicable to the present invention. As such, removal of this reference as a ground for rejection is respectfully requested.

Further, even if Breed is used as prior art, Breed does not overcome and of the deficiencies described above with respect to Inoguchi.

Finally, even if Breed were proper prior art and even if Inoguchi disclosed the elements

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alleged by the Office Action, Breed fails to disclose, teach or suggest utilizing “the neural network and the mask disclosed by [Breed] in combination with [Inoguchi] for the purpose of determining the location of the viewer and eliminating the Moiré patterns and other ambiguities.” With respect to the neural network, discussed solely at column 8, lines 25-34 of Breed, Breed teaches using the neural network to assist in pattern recognition of infrared light reflected within an automobile cabin in order to identify the driver of the automobile. Nowhere does Breed discuss the display of three-dimensional images, never mind teach or suggest adapting a neural network to produce calculated images as is claimed currently in claims 21 and 31. With regard to the allegation that Breed discloses a mask for eliminating Moiré patterns, Applicant submits that Breed does not discuss a mask at column 23, lines 52-59, let alone a mask spaced between two transmissive electronic displays (claims 25 and 35) or such a mask in the form of a diffuser (claims 26 and 36). Breed merely mentions Moiré patterns as an undesirable interference effect of liquid crystals – this in no way teaches or suggests to one of ordinary skill in the art of three-dimensional displays to produce Applicant’s claimed invention.

Thus, in light of the above remarks, Applicant submits that no claims of the present invention are rendered obvious by Inoguchi and Breed, and that these references do not teach or suggest the claimed invention. Thus, all claims of the present invention are allowable over Inoguchi and Breed.

While the remarks above have been directed primarily to the independent claims 19 and 29, Applicant submits that the dependent claims recite additional novel and non-obvious aspects of the invention. For example, claims 20 and 30 further define how selected stereopairs are processed to produce calculated images according to an iterative mechanism, claims 23 and 34 recite that the calculated images are produced for a plurality of viewing zones in the viewing area, and claims 24 and 35 recite that the calculated images are processed from a plurality of stereopairs for delivery to a

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plurality of viewing zones. Independent consideration of all dependent claims is thus respectfully requested.

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CONCLUSION

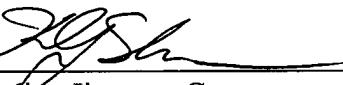
For all of the foregoing reasons, it is respectfully requested that the rejections set forth in the Office Action be withdrawn. Claims 19-38 are allowable over the art of record, and the application is submitted to be in condition for immediate allowance. Favorable reconsideration of this application and a timely Notice of Allowance are respectfully requested.

The Examiner is invited to contact Applicant's undersigned attorneys by telephone to discuss any matters if the Examiner feels such discussions may expedite the progress of the present application toward allowance. No new claims fees are believed due. If there are any other fees due at this time, please charge any fees or overpayment to our Deposit Account No. 50-1349.

Respectfully submitted,

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